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1833

A
M E M O I R
UPON
STAPHYLORAPHY;
WITH CASES,
AND A DESCRIPTION OF THE INSTRUMENTS
REQUISITE FOR THE OPERATION.

BY

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NEW-YORK:

PRINTED BY J. & J. HARPER,

NO. 82 CLIFF-STREET.

1833.

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To A. E. Hosack, M.D.

New-York, May 23d, 1833.

DEAR SIR,

I am authorized by the Comitia Minora of the Medical Society of the City and County of New-York to request of you a copy of your very interesting communication, read before the Society, and describing your newly-invented instrument for the removal of the Bifid Palate, with a view to its publication. Wishing you success in your laudable efforts to add improvements to surgical science,

I remain, dear sir,

Your very obed't serv't.,

DANIEL L. M. PEIXOTTO, President Med. Soc.

To Daniel L. M. Peixotto, M.D., President of the Medical Society, N. Y.

DEAR SIR,

Your kind letter, dated the 23d instant, requesting a copy of my Memoir on *Staphyloraphy*, as read before the Medical Society on the 8th of April last, for publication, was duly received. In reply I have to state, that I consider it as the property of the Society, and to be disposed of as they may think proper; at the same time I beg leave to add, that I am fully sensible of the high honour conferred upon me by the request, and I send herewith the only copy I possess.

Be pleased, my dear sir, to accept my thanks for your polite note, and believe me,

Very respectfully,

Your obt. serv't.,

A. E. HOSACK.

New-York, May 23, 1833.

MEMOIR.

IN 1825, Mr. Roux, a distinguished surgeon of Paris, first called the attention of the profession to a highly interesting and ingenious operation upon the Bifid Palate, which he performed in several cases successfully.

In his memoir upon that subject, he has detailed in a very particular manner the steps of the operation, the circumstances under which it was suggested, together with the advantages to be derived when a perfect cure has been effected. In the preliminary remarks the author very happily draws a comparison between this deformity and that of *hare-lip*, to which it certainly bears a very strong analogy, both from the fact that they are congenital diseases, and incommoding the little patient in a similar manner during lactation; and not unfrequently do we discover them both existing in the same individual, establishing a complete division of the cavity of the nose into that of the mouth. No deformity of the mouth could possibly be attended with more serious distress than the one just alluded to; particularly as the art of surgery has not yet been able to devise any method by which such inconveniences can be wholly obviated.

To render more intelligible these malconformations it will be necessary to recapitulate the different functions of

the parts concerned. It is to be remembered that a perfect vacuum must be formed by the mouth, for a child to derive nourishment from the breast; which can only be accomplished by the palatine muscles drawing the palate directly upwards, in such a manner as entirely to intercept the natural opening between the nose and throat; the trachea is at the same time to mount upwards in obedience to the action of the muscles constructed for that special object; the epiglottis from its convenient position will then be accurately adjusted upon the rima glottidis, so as to entirely cut off all communication: by their simultaneous action three very important objects are attained—a vacuum is formed enabling the child to suck, deglutition takes place, fluids and other substances taken in at the mouth are prevented escaping from their destined route: therefore it is that great difficulty is experienced whenever these deformities occur. That of simple hare-lip is attended with less distress perhaps than any other, as the external conformation of the mouth is alone concerned. When the fleshy palate is divided up to the bony roof of the mouth, suction and deglutition are imperfect; and these difficulties are greatly increased if the division extend through the ossa palati to their juncture with the superior maxillary bones: under such circumstances it is only with the greatest care children are reared. But when the separation is complete, extending from the lip through the upper jaw to the uvula, then indeed is the distress very great, and very seldom do such patients outlive the first year.

Surgical writers, for the most part, when treating of *hare-lip*, divide it into varieties—such as, simple, when a fissure alone of the lip exists; double, when there are two; compound, when the bones of the upper jaw are involved; and compound complicated, when it extends through the pendulous palate, establishing a complete division.* But in refer-

* Such a case I have lately witnessed in consultation with my friend Dr. Wilkes.

ence to the two last-cited instances, no operation is spoken of further than that of excising the surfaces of the divided *lip*, and approximating the parts by suture: if union is accomplished, the condition of the child is improved, particularly if the palate be not involved in the deformity; but should the division be complete, then I very much question if any benefit is to be derived from such an operation.

After having given so particular an account of the varieties of this disease, it can scarcely be necessary to picture the horrors of it from infancy to more advanced years; still, to glance over the most conspicuous of them will not, I trust, be found altogether without interest. During infancy, when the fleshy palate alone is divided, the difficulty of swallowing is, as before noticed, very great, and can only be effected by the nurse holding the child in a perpendicular line; it must be fed by the spoon to give the facility to be derived from position: notwithstanding this precaution a very large quantity of all fluids, taken in at the mouth or rejected from the stomach, must escape at the nose; and the more solid substances, such as pap, will occasionally remain in the nares a source of irritation, accompanied with incessant sneezing, and sometimes with inflammation and ulcer. If the disease be of greater extent, then are all these symptoms increased, and frequently are the *lungs* affected by foreign substances finding their way into the windpipe and minuter ramifications of the bronchæ; the consequences of which are too well known to need further comment. But should the little sufferer be favoured with a robust constitution, and with powers greater than ordinary to struggle with disease, then are our fears for its immediate safety greatly lessened. But to the parent's anxious heart it is poor consolation; for as the child advances in life these ills become the more manifest. Education is interrupted, social intercourse with the world is almost denied, and so difficult indeed are the efforts of speech, that many years may pass before the individual

will have acquired the pronunciation of the most simple words. A person so afflicted can neither blow out a candle, or give sound to the most ordinary wind instrument, without previously stopping the nostrils. These facts are readily understood when we bear in mind the very delicate mechanism of the nose and throat.

It is, however, inferred by many that the cleft palate is of rare occurrence ; which inference I believe to have arisen from the fact, that the archives of surgery furnish but few instances of them.* This malformation is stated by Mr. Roux as occurring quite as frequently as that of *hare-lip* ; and the reason why no records have been preserved of them is in consequence of our art not being able to afford relief. Several years previous to his publication upon that subject, he conceived the idea of uniting the divided palate by a similar operation to the one at present so universally resorted to for the cure of *hare-lip*.

The first case reported by him is so replete with interest, and differs so little from the plan of treatment now in use, that I shall not deem an apology necessary for relating

* Inasmuch as the merits of this operation have been the subject of controversy between Mr. Roux and Mr. Graefe, the distinguished surgeon of Berlin, and not feeling myself at liberty to decide upon the question or enter the arena for discussion, I will beg leave respectfully to refer the reader to the following publications, which embrace all that has yet appeared on the subject of staphyloraphy.

Graefe—die Gaumennath, ein neuentdecktes Mittel gegen angeborne Fehler der Sprache, in Journal fuer Chirurgie und Augenheilkunde, vol. i.

Roux—Mémoire sur la Staphyloraphie, ou Suture du Voile du Palais. Paris, 1825.

Alcock—Transactions of the Apothecaries and Surgeons ; Apothecaries of England and Wales. London, 1822.

In *Révue Médicale*, 1823, July, p. 245 ; also in *Graefe and Walther*, Journal, vol. vi., No. 1, p. 118.

Ebel—Beytraege zur Gaumennath, in Journal of Graefe and Walther, vol. vi., No. 1, p. 79.

Dieffenbach—Vergleichende Anatomische Untersuchungen über das Gaumensegel ; in *Hecker*, Literarischen Annalen, 1826, Febr., p. 145 ; July, 1827, p. 343.

such parts as may tend to elucidate the subject, particularly as it has an important bearing upon the object of this communication.

The case just referred to occurred in a young Englishman named Stephenson, aged 25 years, born with a complete division of the fleshy palate. He was a student of medicine in Paris, and in attendance upon the lectures at l'Hôpital de la Charité, where he had been for a year and upwards. On the eve of his departure for Edinburgh,* he called upon Mr. Roux for the purpose of thanking him for the benefit he had derived from his instruction as surgeon of that extensive establishment. During his conversation, the professor's attention was particularly attracted by the great embarrassment and difficulty of speech under which the young man at that time laboured. Upon examination, "the palate was found divided in a middle line to its full extent, presenting a triangular space, which very much enlarged the natural communication between the mouth and pharynx; half of the uvula was to be seen at the lower extremity of each part of the cleft, the bony roof was regular and perfect, and no trace was discoverable upon the mouth of *hare-lip* having ever existed." At a moment when the mouth was wide open, Mr. Roux observed an involuntary motion in the fauces, doubtless caused by the accumulation of saliva at the bottom of the throat, exciting an effort to swallow, which could only be accomplished by the patient raising the lower jaw. During this effort the borders of the divided palate approached each other so as for an instant to appear united: which fact was, of course, a convincing proof that there was no want of substance, and also served to satisfy the surgeon that the operation he had so long meditated could, with great benefit and with perfect safety to the individual, be put in practice. Consequently he ex-

* Mr. Stephenson was about departing for Edinburgh, with the view of receiving his degree in medicine from its renowned school.

pressed his views fully to the young physician, who immediately comprehended them, and was delighted at the prospect of finding relief from a disease which had caused him so much distress.

The symptoms present in this case, both during infancy and after, bear so striking a similarity to those already described in the preceding pages, that a statement of them here becomes unnecessary,—suffice it to say they were not less aggravated.

In the performance of this operation two very important objects present themselves: the first is, that of carefully excising the borders of the cleft, and thereby rendering them susceptible of adhesive inflammation; the second is, to retain the parts in perfect coaptation during that process. For the former, Mr. Roux imagined that the edges might be cut off, either with the straight probe-pointed bistoury, or by the angular scissors, usually found in the pocket-case of instruments. This point being settled in his mind, he next gave his attention to the means necessary for retaining the raw surfaces in contact. It occurred to him that the suture was the only one upon which he could with certainty depend; and consequently determined upon it for that purpose—not the ordinary twisted thread commonly used, but a ligature, made by plaiting three very fine strands together,—this he conceived would be less likely to yield, and on that account it was preferred. The simple suture was used in the case of Mr. Stephenson; as it could be applied to the palate with less difficulty to the surgeon, as well as with less inconvenience to the patient. From the extent of the division three were deemed necessary, to be placed at equal distances from each other—one near each extremity of the cleft. The small curved needles were employed to carry the ligatures through the palate; they were held by a pair of pincers usually employed by surgeons in France for making sutures in deep parts, and from that circumstance is called *porte-aiguille*; “without which,” Mr. Roux

remarks, "it would have been impossible to have passed the needles at the bottom of the throat." Each perforation was made from behind forward, about a quarter of an inch from the border—the surgeon availing himself of that opportunity when the palate was perfectly at rest,—the point was then seized with the ordinary dressing forceps and brought out, leaving the ligature in its passage. In this manner the three ligatures were placed in the palate preparatory to the second step of the operation, that of excising the edges, which should always be accomplished with the least possible loss of substance, as well as with the greatest regularity, in order that their surfaces may admit of the better adjustment. If the bistoury is preferred for excision, then the lower point of the border of the palate is to be drawn downwards, and there to be held in a state of tension by a pair of forceps, constructed with a ring for that purpose, known by the name of *pince à anneaux*; the knife is then to be carried on the outside of the pincers, with its back opposed to the base of the tongue; it is then to be directed from below upwards, cutting from the borders of the palate a strip of about a line in thickness throughout; at the same time carefully avoiding to extend it further beyond the angle of union than is absolutely necessary. The same thing was repeated on the opposite side, joining the two wounds at the upper extremity of the commissure of the palate. During this part of the operation great care must be taken that the ligatures are not divided by the edge of the instruments. It now remains to place the raw surfaces in contact, which are to be retained in that position by means of the suture until union takes place. The lower ligature was first tied, afterward the upper, and then the middle. The first knot of the first ligature, when tied, was held by the *pince à anneaux* to prevent it yielding, until the second could be applied upon it—this precaution was observed in each of the other two successively,—the threads were then cut off close to the

knots, which of course completes the operation. In tying the ligatures no greater force was exerted than was absolutely necessary for retaining the parts in perfect coaptation. It is also worthy of remark, that no instrument was used or was necessary, in the case of Mr. Stephenson, for holding open the mouth or depressing the tongue.

In the after-statement of circumstances, Mr. Roux goes on to remark, that it was impossible for him to resist the desire of knowing the first effects produced in simply approximating the palate by suture ; he therefore asked Mr. Stephenson to pronounce certain words, which he did to the entire satisfaction and delight of all : his voice had altogether changed its character, and could not be recognized as the same,—but as these experiments were not considered prudent, lest the parts should become deranged, they were discontinued.

After that time, the surgeon enjoined on him the strictest precaution, as every thing depended upon perfect rest, consequently the patient observed the most profound silence ; all his wants were expressed by signs or in writing. During the process of union he neither ate nor drank, nor did he even allow the saliva to be swallowed, which, from the irritation of the throat, had very much increased. A very slight inflammation appeared upon the palate and fauces, which continued as long as the cause remained. At the end of the third day, the two upper ligatures were carefully removed ; and at the end of the fourth day, the remaining one, leaving the part perfectly united. He was now, for the first time, allowed to swallow a very small quantity of soup, which he did, in the presence of the surgeon, without the least difficulty, and with most excellent relish. He was not, however, permitted to speak until after the eighth day, from which time all further precautions were unnecessary. Very great changes were already discoverable in his voice, as well as in his pronunciation ; he was fast losing the nasal sound, together with that im-

pediment which characterized the deformity. Six months after the operation, Mr. Stephenson returned to Paris, having received his degree of Doctor of Medicine at the University of Edinburgh. His inaugural Thesis* was upon that operation, and in which the meed of merit is very gratefully awarded to his benefactor, whom he visited for the last time prior to his departure for Canada, when it was observed he had gained considerably, and was almost as perfect in pronunciation as a person having a slight hesitancy in speech, where no malconformation exists. It will be perceived that the plan of first passing the ligatures and afterward excising the borders, is the reverse of that in the operation for *hare-lip*, which may readily be explained, when we bear in mind the time occupied in passing the ligature through the palate at the bottom of the mouth. If excision was first performed, the operation would be much protracted, hemorrhage would obscure the parts, thereby rendering the application of the needles extremely uncertain; while in the operation for *hare-lip*, it is to be recollected the parts involved are immediately under the observation and control of the surgeon, consequently he is enabled to make the suture immediately after excision has been performed: the sides of the wound may then be brought together while yet in a bleeding state, which doubtless very much contributes to its perfect consolidation.

In the second volume of the *Lancet*, a very interesting case is published by Mr. Alcock, of London, wherein the operation of uniting the bifid palate was successfully performed. The deformity was quite as extensive as the one just related, as treated by Mr. Roux, of Paris. The whole of the fleshy palate was divided up to the bony roof of the mouth. The difficulty of speech, &c., &c. were in all respects the same: "His voice was strikingly nasal, and his articulation so indistinct that he had contemplated giving up an advantageous situation, in which he was

* *Dissertatio de Velosynthesi* Edinburgi, 1820.

required to converse frequently with strangers." The first step of the operation, it is to be remarked, was the removal of the extreme edges by the scissors. "The edges being removed, and the bleeding from the divided portions having ceased, two ligatures were introduced, by means of a small curved needle, at equal distances from each other, and from the extremities of the cleft." The author goes on to state, "It may seem uselessly minute to describe every trifling circumstance, but, without strict attention, the ligatures may be passed lower on one side than on the other" (this accident has happened, and therefore should be carefully guarded against). The parts were then approximated, and the same injunctions were put upon the patient as noticed in the preceding case. The writer speaks of the great annoyance experienced from the extremely tenacious saliva or mucus so abundantly poured out upon these parts, when irritated by the necessary removal of the edges, and the insertion of the sutures. The inflammation which supervened is stated not to have proceeded to any alarming extent. The ligatures were removed on the fourth day, when it was discovered that a very slight union had taken place, and only at that point supported by the lower suture. The same operation was repeated nine days after, and but little more was gained. The surgeon, fearing that the parts had been bruised by the scissors, determined to try the knife in his next attempt, which was done, and with similar results. The operation was twice after repeated with the scissors, each time some addition to the former extent of union was effected. The patient's health having become somewhat disordered, probably from his altered mode of living, all further attempts were deferred until two months, when he became anxious to have the remaining ununited portion brought together. A plan somewhat different was tried: "The internal edges of the uvula were removed by the thin-edged scissors as before, and two pins, adapted to the form of the parts, were in-

serted at convenient distances from each other. The ligatures were passed round the pins, by which means the parts were perfectly coaptated. The upper pin was removed on the seventh day, but the fact of union having taken place could not be definitely settled until after the removal of the second pin, which was done on the ninth day ; and, to the great delight of the patient, it was ascertained that union had taken place to the lowest point of the uvula. I will use the author's words in illustration of the advantages derived, when success attends this operation : " This individual, whose case is above described, lost the nasal sound of voice after the last operation ; but the effect of careless habit was still perceptible, when he spoke heedlessly in some difficult words : yet, when his attention was directed to any particular sound, and the defective word distinctly pronounced by another, and the position of the tongue, lips, &c. shown, his utterance was perfectly distinct, and free from any obvious peculiarity." I have here quoted more extensively than the reader might perhaps approve of ; but I consider it an act of justice due to that gentleman, who has certainly, in a very candid manner, stated the disappointments and difficulties which he experienced. If surgeons generally would adopt the same liberal spirit towards their fellow-practitioners, a very great good might be derived, and the cause of humanity would be better served ; for it is a remark of a distinguished surgeon, that an unsuccessful operation, honestly related, contributes more to the stock of knowledge than a multiplicity of cases attended with favourable results.

More than one reason may be assigned for the want of success in the first attempt at union, in the case just alluded to, as related by Mr. Alcock, of London. With all deference to that surgeon, I will endeavour to point out such as in my judgment may be cited as the principal causes of disappointment. It is to be remembered that the edges were excised preparatory to the passing of the ligatures ; in this

particular it differs from the plan pursued by Mr. Roux, and to which deviation very serious objections may be offered. The hemorrhage consequent upon this part of the operation would unavoidably cause delay ; for it would be impossible to make the suture at the bottom of the throat if the palate be obscured by blood. Excess of coughing would likewise be produced by the bleeding, from the excised part diffusing itself throughout the *fauces* ; therefore much time would be lost in waiting for the hemorrhage to be arrested, as well as for the throat to again become tranquillized : the wound must also be left exposed to the action of the air all this while, as well as during the time required for the passing of the ligatures, which, with the instrument described for that purpose, must have been considerable. We may therefore conclude that the operation was unnecessarily protracted by this method of proceeding, and that the raw edges were too long exposed for a perfect union to have taken place. We have also to remark, that two ligatures could not have been sufficient for retaining the parts in a state of contact the length of time requisite for adhesion. It is to be remembered that the *tendon* of the *tensor palati muscle* is carried quite down to the apex on either side of the palate ; and its action would constantly tend to draw the parts asunder at the superior portion of the cleft, while that which is properly termed the uvula, or pendulous palate, would be drawn directly upwards : therefore it is not to be wondered at that the superior ligature was inadequate to retain the parts together, having the action of that muscle constantly to oppose ; while, on the contrary, the lower ligature, having nothing to relax its hold, retains the edges in contact until union takes place.

These then are the reasons that I would assign why the operation did not at first prove successful.

Between three and four years ago, I was requested by Dr. Richard Pennel, of New-York, to visit with him in consultation a young lady, seventeen years of age, labouring

under the deformity of bifid palate, which had existed since her birth. The object of our meeting was to ascertain the practicability of our operation, as well as the benefit that was likely to accrue from it. Upon examining the throat the deformity was very manifest: the fissure was observed extending the full length of the fleshy palate, quite up to the bony arch of the mouth, dividing it into equal portions, which were drawn up on either side so as to present an entire view of the pharynx and parts connected with it. Upon conferring with the physician in attendance, I related to him the nature of the operation which I would propose, being that of excising the borders and approximating their surfaces by suture, and as performed by Mr. Roux of Paris; also the manner in which he speaks of it, "as one of the most difficult in surgery." This expression, I remarked, ought perhaps to deter me from the attempt, at least with the present plan of instruments adopted in practice. He agreed perfectly with me that considerable difficulty might be anticipated; and as there was no immediate cause for hurry, we determined upon deferring it, with the view of devising some means by which the desired objects might be more readily accomplished. It afterward occurred to me, that, as the greatest difficulty and delay were experienced in the passing of the ligatures,—arising both from the irritability and constant motion in the palate, as well as the unavoidable disposition to swallow,—an instrument might be constructed calculated to lessen the inconvenience as well as to shorten the time. I consequently caused one to be made, as represented in the plate; and which I have since improved, and find perfectly to surmount the objections. In the application of this instrument the surgeon is enabled to fix his eye on the part through which the ligature is to pass; the palate is at the same time and with the same instrument firmly held, so as to avoid displacement by any involuntary motion that may occur. The time required for passing each needle is but an instant, and it can always

be accomplished with the greatest accuracy, as regards the relative distances as well from the borders as from each other. This point being determined, I directed my attention to the second step of the operation, which is properly that of excision. The straight bistoury and the ordinary angular scissors are as yet the only instruments used for that purpose. In offering objections to them, I trust that I may escape being censured for too great a desire of finding fault, as well as from any unreasonable prejudice in favour of invention. Having performed the operation, I feel myself at liberty to suggest an alteration in the scissors, which, while it embraces all the advantages possessed by the above instrument, offers facilities to the surgeon. He is at once enabled to follow with his eye every movement of the blades, until the borders are entirely separated, and thereby control the extent and amount of substances to be removed. Two scissors will be required—one for either side, six inches in length,—when viewed in profile their form inclines to that of the letter *f*. The blades from the juncture to the point are curved laterally and forwards, so as very much to resemble the beak of an eagle, or any other bird of that class, and which, when applied to the palate, adapt themselves to the arched sides of the cleft.

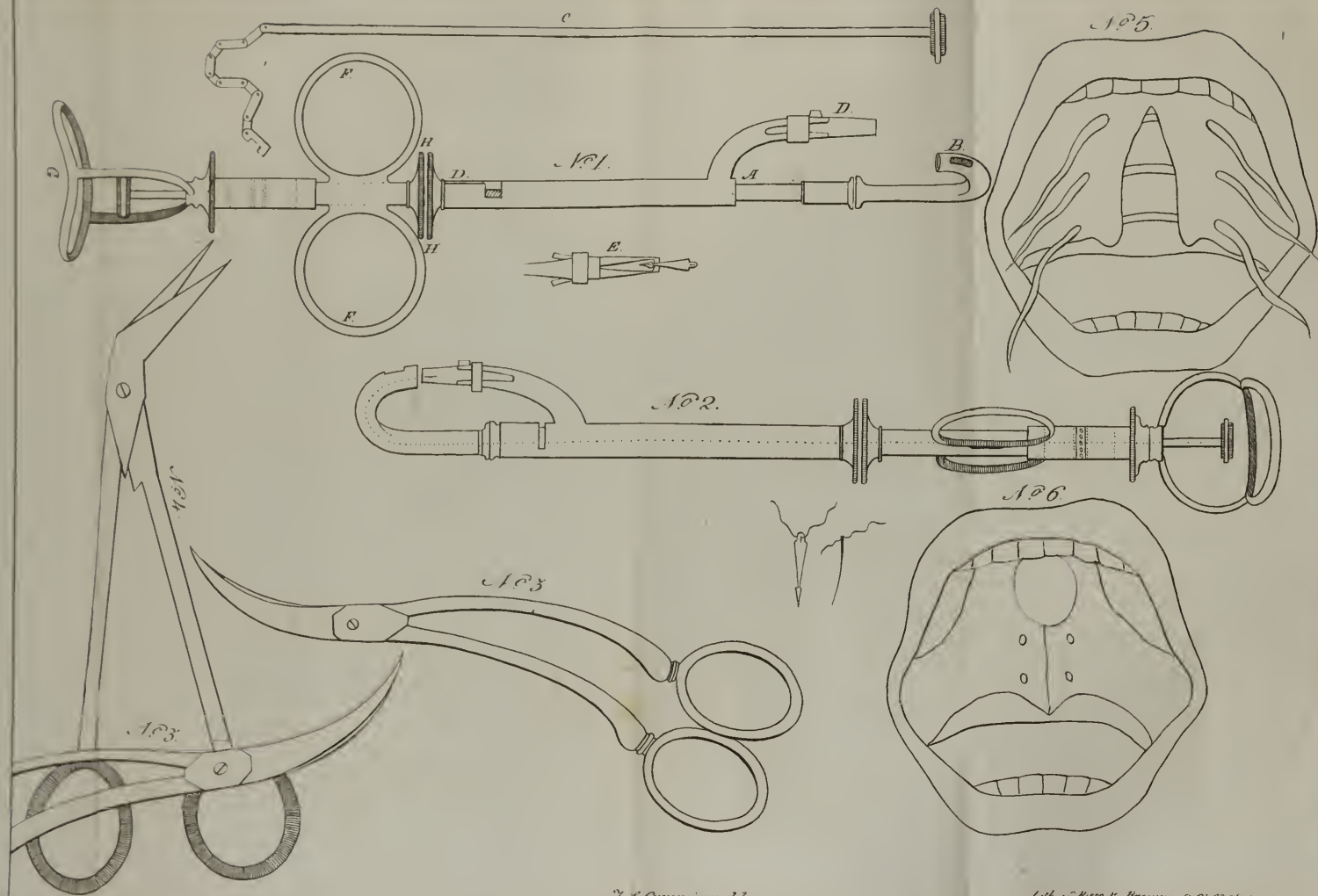
In the month of March last I was consulted by my friend and fellow-student Dr. M'Comb, of the United States' army, in reference to a soldier, between twenty and thirty years of age, afflicted with this malconformation of the palate. He had been born with the disease, but in every other respect was healthy and of a robust constitution. I proposed the operation for his relief, which was immediately acquiesced in, both on the part of the surgeon and patient. The division was not as extensive as represented in the plate, and on that account it augured favourably. In this operation I anticipated a twofold pleasure: the first was that of exhibiting to my friends the advantages possessed by the instrument just described, for passing the ligature in

parts so remotely situated ; the second was that of the successful termination of the case—both of which have been fully realized. On the 2d of April I operated on the patient in the presence of Drs. Mott, Francis, M'Comb, and Wilkes. A ligature was first passed through the uvula on either side, by which means I was enabled to command and hold the palate in a state of tension at the time of separating the borders. This advantage may be enumerated among others for passing the ligatures preparatory to excision. It is to be observed, in the case related by Mr. Roux, that the pince à anneau was used for the same purpose which I have here assigned to the ligature through the pendulous palate. During the operation an untoward circumstance occurred, tending greatly to embarrass me, and which threatened to interfere with the prospect of union by the first intention. I have thought proper to notice it in this particular manner, believing it important, inasmuch as it may be the means of guarding others against a similar accident. The patient was an habitual snuffer, and had thoughtlessly indulged himself a short time before taking his seat : this was not discovered until the introduction of the last needle, when, from the position of the head, the snuff was observed passing down behind the palate. He was directed to rinse his throat with a little water, hoping to prevent its descent into the stomach, but without success : vomiting supervened, and caused considerable delay ; but upon its cessation the operation was resumed ; the edges were detached, and the parts brought in contact. The tying of the knots was all that remained to be done, which, from the depth of parts, and the narrow space for applying the necessary force, I thought, could not be accomplished without the aid of instruments ; but at that moment my friend Dr. Mott suggested the propriety of dispensing with them, and of endeavouring by the assistance of my fingers alone to effect its completion ; which was accordingly done. The reason to be adduced for this performance, independent

of lessening the number of instruments, is the advantage derived from the sense of touch regulating the degree of force necessary to be applied.

The same precaution stated in the foregoing cases was strenuously enjoined upon the patient, and as carefully observed by him. On the ninth day the parts were ascertained to be perfectly united : from that time he has performed his duty as a soldier, and at present enjoys the best of health.





No. 1 represents a front view of the instrument for passing the needle. A, the hollow shaft with the curved extremity. B, an aperture through which the eye is to direct the head of the needle into the thimble. C, the rod drawn out, with the chain and thimble-like extremity attached to it. D, the bayonet fixture, adjusted upon the shaft, with the forceps for receiving the needle. E, a profile view of the forceps holding the needle. F, the rings for receiving the first and second fingers of the right hand. G, the guard upon which the thumb of the same hand is to rest. H, the wheel, or that part of the bayonet fixture by which its motions are controlled. The index finger of the left hand is to be placed upon it, by which means it is turned until brought opposite to the crook, in which the needle is concealed; it is then to be pushed quite up, holding the palate between. The thumb of the right hand is at that moment to glide through the guard, upon the button of the rod, which is then to be thrust forward, driving the needle, armed with the ligature, into the forceps; the bayonet fixture is then drawn back and turned off, carrying the needle with it.

No. 2. A profile view of the same in the act of receiving the needle.

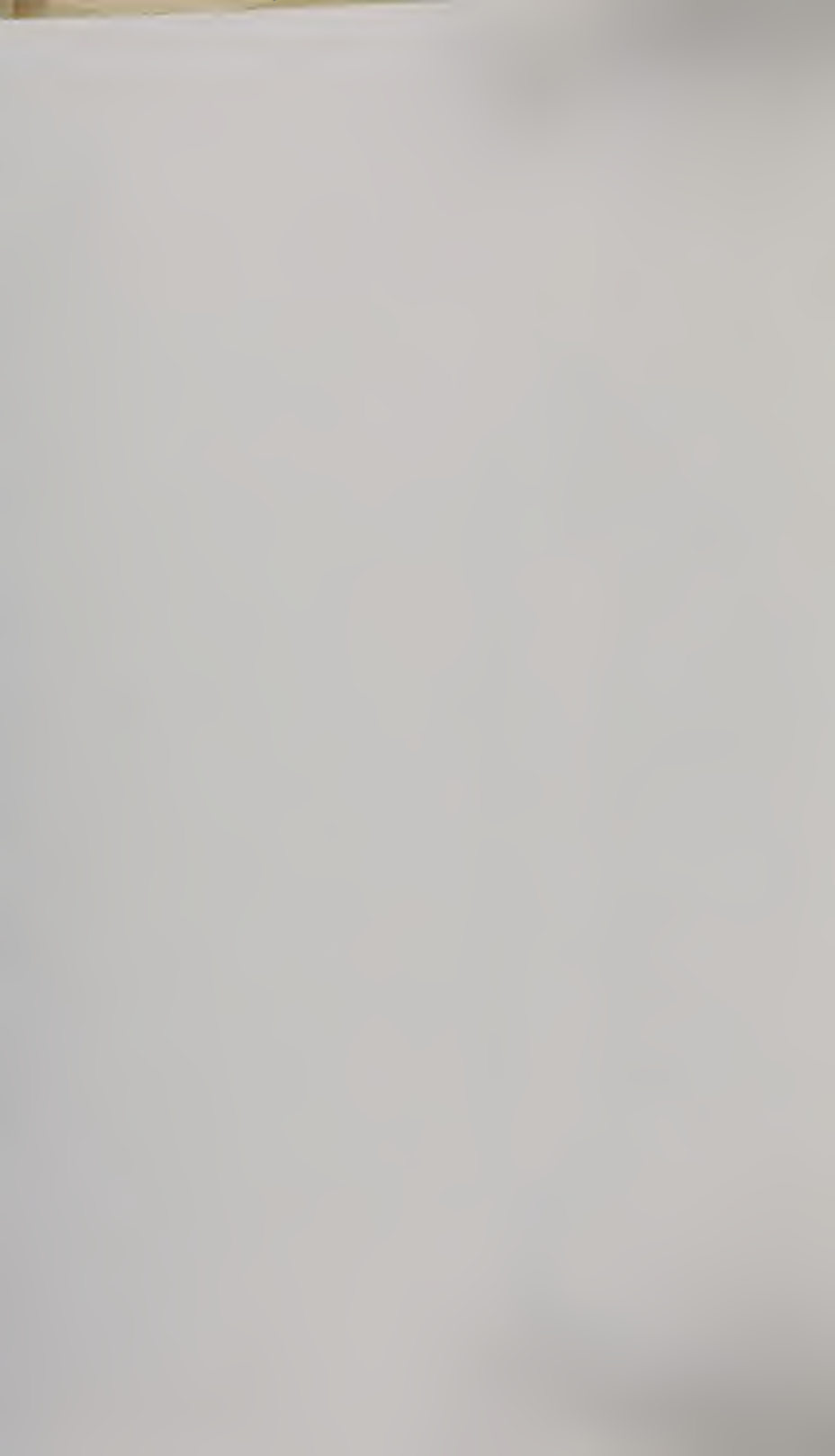
No. 3. The double-curved scissors, described in page 18.

No. 4. Mr. Roux's scissors.

No. 5 represents the disease, with the ligatures passed.

No. 6. Taken from a patient operated on by Mr. Roux, where the disease extended through the bony palate. I have selected this drawing with the view of showing the advantages of this operation even under such circumstances.

The above instruments were made by George Tiemann, Surgical Instrument Maker, Chatham-street, New-York.



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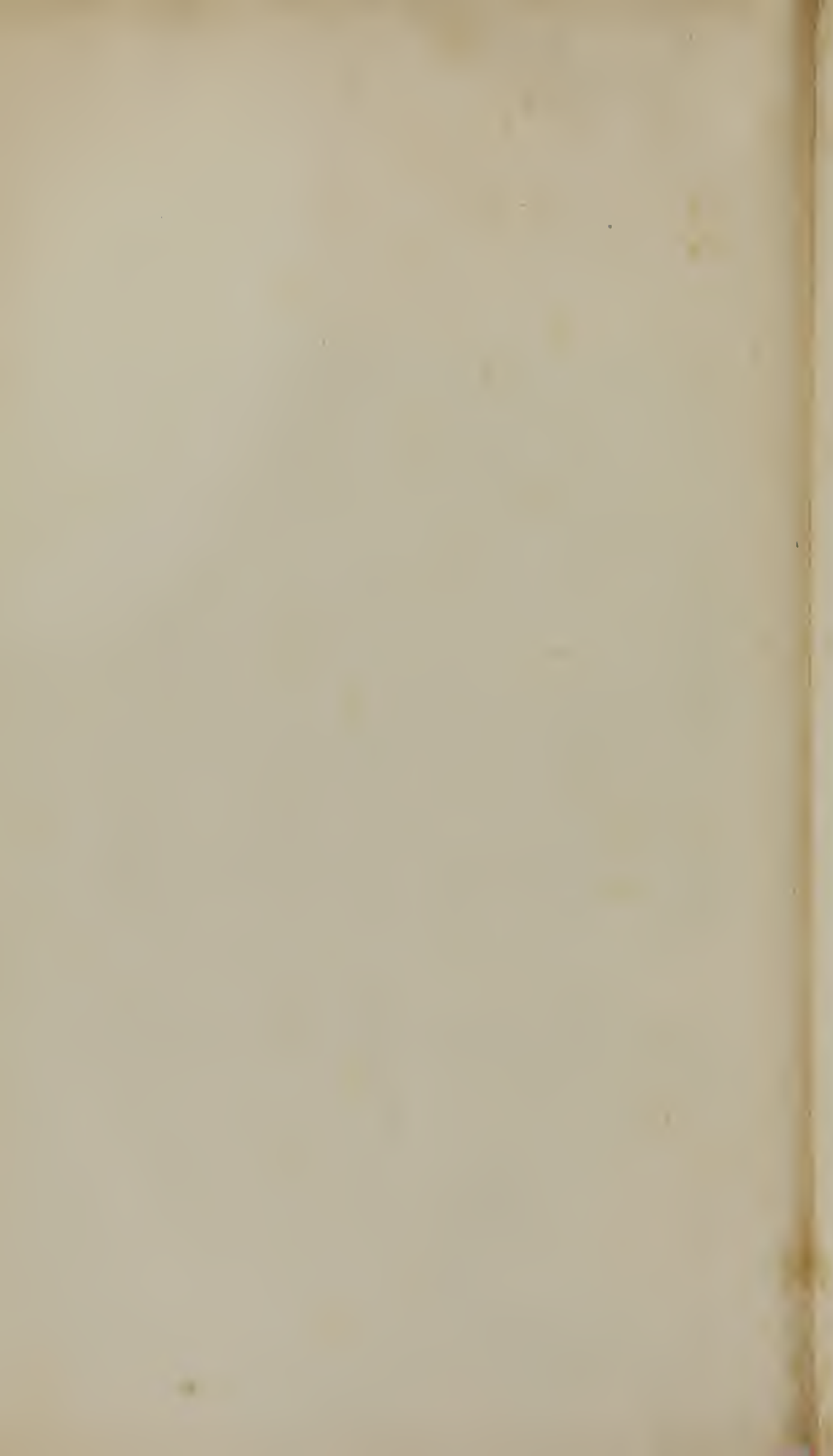
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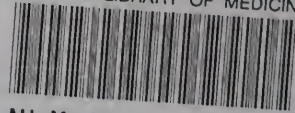
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